

USAWC STRATEGY RESEARCH PROJECT

**THE TEMPORAL AND SCALAR MECHANICS OF CONFLICT: STRATEGIC
IMPLICATIONS OF SPEED AND TIME ON THE AMERICAN WAY OF WAR**

by

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ABSTRACT

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Many theorists have plied their craft to try to capture the essence of the “American way of war.” Few have considered the issues of *time* and *speed* as they relate to American warfare. American strategic and popular culture puts a strong emphasis on speed, and this is not necessarily a bad thing since speed can provide a number of advantages in combat. However, it is important to avoid viewing speed as a “universal good” since it can create problems and pathologies, especially at the strategic level. This paper explores the phenomenon of speed and time in war by analyzing how those concepts relate to military operations. It examines speed and time within the context of American strategic culture and their influence on modern combined arms. It also answers the question, “Is the use of speed an unquestioned good in the art of war?” Additionally, it uses case examples from several conflicts to address whether any pathologies exist regarding the employment of speed and time. Lastly, it offers a strategic calculus for planning 21st Century war that can aid future strategic leaders in determining the right mix of temporal and scalar synchronization needed to achieve success in conflict.

THE TEMPORAL AND SCALAR MECHANICS OF CONFLICT: STRATEGIC IMPLICATIONS OF SPEED AND TIME ON THE AMERICAN WAY OF WAR

The American way of war has continued to evolve over the last 230 years. In that time, many noted theorists have plied their craft to try to capture the essence of the “American way of war.” Several have explored the Clausewitzian mechanisms of combat that include men, space and time¹. However, few have considered the issues of *time* and *speed* as they relate to American warfare. U.S. strategic and popular culture place a strong emphasis on speed, and this is not necessarily a bad thing since speed can provide a number of advantages in combat. However, it is important to avoid viewing speed as a “universal good” since it can create problems and pathologies, especially at the strategic level. This paper explores the phenomenon of speed and time in war by analyzing how those concepts relate to military operations. It specifically examines speed and time within the context of American strategic culture and their influence on modern combined arms.² It also seeks to answer a seldom asked question, “Is it appropriate to consider the use of speed as an unquestioned good in the art of war?” Furthermore, using case examples from several conflicts involving American forces, this paper considers whether any pathologies exist regarding the employment of speed and time. Lastly, the paper offers a strategic calculus for planning 21st Century war that can aid future senior leaders in determining the right mix of temporal (aspects of or related to the essence of time) and scalar (the expression of the expansive quality of speed as it relates to time) synchronization needed to achieve success in conflict.³ As a point of departure, it is prudent to begin exploring the intricacies of speed and time in conflict by framing the strategic national security environment in which war may occur.

The Future National Security Environment

The U.S. Army War College uses the acronym “VUCA” to describe the volatile, uncertain, chaotic and ambiguous environment in which strategy is made.⁴ If the present is any indication of the future, then it is reasonable to assume that the world will become increasingly dangerous as long as that strategic environment exists. Many long-range assessments predict that global tensions will continue to rise as resources become even more constrained and as transnational threats endanger international security.⁵ Future leaders and planners can expect to see weak and failed states persisting to dominate U.S. foreign policy agendas. Terrorism will remain a vital interest, and the use of American military strength will remain focused on the dissuasion, deterrence, and, where necessary, the preemption of strategic conflict. Enemies will work aggressively to offset U.S. military superiority by seeking out technologies that will offer some

level of asymmetric advantage, and the challenging asymmetric nature of future conflicts will add deeper complexity to both war planning and the development of national security strategy.⁶

The "National Defense Strategy of the United States," published in March 2005, addressed the unconventional nature of the future. It argued that enemies are increasingly likely to pose asymmetric threats resulting in irregular, catastrophic and disruptive challenges.⁷ This means that, in some cases, non-state actors will choose to attack the United States using forms of irregular warfare that may include the use of weapons of mass destruction. These actors may also seek new and innovative ways to negate traditional U.S. strengths to their advantage.⁸ In fact, one author theorizes that "speed of light engagements" will be the norm by the year 2025, and America may lose its monopoly on technological advances as hostile nations close the gap between technological "haves" and "have nots."⁹ This type of warfare lends itself to engagements of varying speed and temporal geometry.¹⁰ Therefore, in conflicts of the future, time and speed will matter. Consequently, it is necessary to analyze these elements with rigor and discipline in order to understand their far-reaching implications.

"The American Way of War" Revisited

Vital to any discussion regarding speed and time in war is the articulation of the "American way of war." This is a concept and phrase used in many different contexts. Historians recognize it mainly as the title of Russell Weigley's classic book.¹¹ However, strategists and scholars of national security policy have also taken it up recently. What bears significance is the notion that, despite the varying perspectives on the subject, all these works appear to share a way of thinking about how America employs the use of force to achieve its national objectives. Colin S. Gray, in his article *The American Way of War: Critique and Implications*, asserted five claims regarding this view:

- "1. There is a distinctively American approach to war in warfare.
2. This distinctively American approach is so rooted in the nation's historical experience, and the beliefs that Americans hold about that experience, including myths and legends, that it merits ascription as cultural.
3. This postulated American way of war, though cultural, rests upon significant and persisting material realities.
4. Americans behave in new strategic contexts, and with new material assets, in a fashion shaped, at least influence, by their culture as reflected in the national way of war.
5. The American way of war is always subject to some revision, at least temporarily in practice, in the face of enemy challenge at every level: political, grand strategic, military strategic, operational, and tactical."¹²

Gray further explained what he considered the characteristics of the American way of war. Of the twelve aspects listed, six in particular (e.g. Apolitical, Astrategic, Problem Solving/Optimistic, Technologically Dependent, Impatient and Sensitive to Casualties) have scalar and temporal implications.¹³

Another perspective on the American way of war relevant to the discussion of temporal and scalar influences appeared in the paper, "American Military Strategy," where Professor Samuel P. Huntington stated that U.S. strategy and the processes that created it should be reflective of the nature of American society.¹⁴ Likewise, Professor Huntington pointed out that it is the American way to plan to win quickly and fight with overwhelming force.¹⁵ Antulio J. Echevarria II's article, "Principles of War or Principles of Battle," conjectured that what people call the principles of the *new* of American way of war--speed, knowledge, jointness, and precision-- are also general principles of fighting and of battle.¹⁶ Harlan Ullman's view of the American way of war pointed to two aspects directly associated with American warfare. First, he noted that the revolution in military affairs has systematically transformed American military might, making it more agile, lethal and flexible.¹⁷ In addition, he commented that transformation allowed flexible, swift and lethal forces to execute one of the most remarkable military campaigns in history when in 2003 coalition forces covered of 400 miles in three weeks to capture Baghdad.¹⁸ In still yet another perspective on American warfare, Ralph Peters expressed the point that, in the age of real-time communications and "metastasizing global media," the dominant principle of winning on future battlefields is speed.¹⁹ Peters also indicated that, historically, "Americans are known masters of the quick draw, a fact that is well known by and exploited by our enemies."²⁰ In each case, speed remains a recurring theme in U.S. warfare. Even national policies continue to shape an American way of war based in large part on speed and time. Pressures from those policies drive U.S. military services to seek newer, faster and more complex capabilities to achieve battlefield dominance.²¹

Clearly, speed is an issue of highest priority as evidenced by the following examples. In 1997, Former Army Chief of Staff Dennis J. Reimer signed a document emphasizing the American Army's need to devise a means of accelerating the speed of movement across a deadly war zone by an order of magnitude to take advantage of the offensive in combat. Moreover, the document predicted that the union of speed and knowledge would quicken an American commander's divination of an enemy's weaknesses and possibly offset the influences of uncertainty and chance in conflict.²² In the 1998 release of "Knowledge and Speed: The Annual Report on the Army After Next Project to the Chief of Staff of the Army," Army leaders stressed that an enemy's ability to exploit time in conflict can severely influence an American

strategic response to particular situation. Therefore, it would be imperative for U.S. military might to get there first.²³ Four years later in June 2002, shortly after the events of September 11th, President Bush addressed America's future military leaders at West Point stating that a transformed fighting force is "a military that must be ready to strike at a moment's notice in any dark corner of the world."²⁴

Military services appear to be increasingly dependent on speed, and these organizations continue to place a premium on its relative value. The Army's "Field Manual 1: The Army," embraces the idea that speed is critical to its operational concept, necessary for maneuver forces to keep the initiative in battle, and vital towards achieving shock and surprise.²⁵ The United States Navy looks to speed as an essential component of maritime operations. In "Fleet Tactics and Coastal Combat," Wayne P. Hughes reasons that speed is necessary to win the sea battle within the first few shots of an engagement.²⁶ The United States Air Force has plans to increase the speed and fidelity of command, control, communications and computers, intelligence, surveillance and reconnaissance (C4ISR) to create Predictive Battlespace Awareness over the combat area. The desired end state of these capabilities will be "getting a cursor over a target" upon demand.²⁷ Even U.S. Air Force doctrine is replete with references to speed. The concept of speed clearly underlies the tenets and principles of airpower as an enabling factor.²⁸

One can also see the influences of scalar references in national policies and guidance. The 2004 *National Military Strategy of the United States of America* focused repeatedly on the use of military campaigns to "swiftly defeat the efforts of adversaries" and "rapidly establish / reestablish security conditions" favorable to the United States and its partners. In fact, the document employed the word "swiftly" at least 10 times, used "quickly" 10 additional times, and used "rapidly" 14 times in the span of 38 short pages.²⁹ Similarly, a scan of the 2006 Quadrennial Defense Review located 28 instances of the word "rapidly" within the document.³⁰

Speed has insinuated itself powerfully into the American worldview over many years. Therefore, it is important to comprehend how Americans arrived at this heavy focus on speed in combat. Is there some cultural basis for this being so, some historical precedent? The answer lies in an understanding of both American culture and the American way of life.

Socio-Political and Psychological Strategic Context for Speed and Time in American Strategic Culture

Today, both temporal and scalar influences are literally reorganizing the "cultural DNA" of American society. As a nation, Americans have become obsessed with notion of speed and all its perceived benefits. This obsession permeates national culture in orders of magnitude

ranging from the mundane to the exotic. Fictional characters from pop movie culture quip lines such as “I feel the need...the need.. for speed!”³¹ Pharmaceutical commercials barrage viewers with onslaughts of promises for “immediate relief” from the pain of everyday life if they consume that company’s product.³² Computer icons such as Bill Gates talk about how the world will evolve into an entity that manages information technology at the speed of thought, and other vendors such as Intel® continue to build Information Technology that will eventually operate at lightning speeds.³³ In the article “The American Way of War,” authors Arthur K. Cebrowski and Dr. Thomas P.M. Barnett made the statement that “a defining characteristic of the American Way of War is the growing ability of U.S. forces to execute operations with unprecedented speed and we (Americans) may choose our punches with great care (strategy), only to unleash them with blinding speed (operations, tactics).”³⁴ The evidence thus far appears to corroborate Cebrowski and Barnett’s position. One can look in any direction and see how deeply the aura of speed pervades American thinking. Speed is, of course, an idea located within the broader context of time.³⁵ Since the days of antiquity, attempts to illuminate the nuances of time have occupied the minds of scholars, philosophers, theoretical physicists and warriors alike. According to some theorists, the aspect of time is rapidly becoming a critical dimension of warfare.³⁶ If true, then it follows that the concepts of time, and therefore speed, have shaped American thinking socially, politically and psychologically.

The Emotional Influences of Time. Historically, human beings have viewed time through both philosophical and emotional lenses. As time flows from the future to the past, humans move away from the “ambiguous” to the “recognizable.” It is that uncertain future, that nebulous and ethereal context, which causes an almost primal fear to manifest in the minds of some people. “Will I get that promotion this round?” “How solid is my financial portfolio?” “How will I care for my family?” “Will a terrorist strike occur tomorrow, or the next day, or the next week?” In his landmark book, *The Direction of Time*, Professor Hans Reichenbach discussed the “emotive significance of time,” portending that time ultimately ends with one’s death. It is this effect of nature that causes humans to associate the “fear of death” with a “fear of time.” In Reichenbach’s own words, “The phrase, ‘passing away’, by means of which we evasively speak of death without using its name, reveals our emotional identification of time flow with death.”³⁷ Although time actually remains relative, human perception translates “passing time” with speed and death, leading people to embrace the idea of “investing time.”³⁸ Americans have adopted this belief with a passion. “Quicker” equates to “better” because tomorrow may never come.

Evolution of Temporal and Scalar Influences in American Strategic Culture. The very first colonists who landed in the New World fled the old in an attempt to satisfy their need for

religious and rural gratification. These settlers were free to practice their faith as they desired and to own vast amounts of land that the New World provided in abundance. However, living in the wild brought with it the needs of daily survival, and this formed the genesis of America's need for immediacy and self-gratification. The "now" became more important than the "future."³⁹ The same phenomenon occurred as the colonies, burdened with over-taxation and tired of living under an unjust British ruler, choose the immediacy of revolution to rid themselves of England's yoke. In Europe, political reform required much more time. Americans wanted their freedom *now*, not later. The industrial revolution in the 18th-19th century in the U.S. also telescoped time. As technology improved, Americans were empowered to do more. They could expand further westward and gain more land, build greater machines with even greater production capacities, and fuel the desires of a nation hungry for more wealth.

This increase in technology bolstered U.S. national capabilities, a fact seen clearly during the American Civil War. Beyond doubt, the Civil War was a conflict won on national capabilities, specifically economics leveraged against military might. At the beginning of the Civil War, the North laid claim to 23 states with a population of approximately 20 million. Conversely, the 11 states of the South had 9 million that included approximately 3 million slaves.⁴⁰ Even though this allowed more southern men to fight (instead of working at home), the North retained compelling superiority. For example, despite the fact that they had fewer slaves, Northern farmers were able to generate more edible crops than their southern analogue. Additionally, the preponderance of the nation's precious metals resided in the North. The Union was very adept in their management of banking, their creation of and ability to sustain factories supplying the war effort, shipbuilding, and their ability to use their expansive railway system to move supplies, men and equipment.⁴¹ With their navy, the Union commanded the seas and thus egress to European factories and trade. Despite this Northern superiority, the South also enjoyed some advantages. Confederate territory was prodigious, and this would eventually cause havoc with the Union's supply lines and ability to mass forces.⁴² The defensive nature of the Confederate strategy also forced upon the Union the need to occupy that land, thus placing further strain on the Union army and Union resources. In parallel, the South had its own impediments. The significantly smaller Confederate navy was vulnerable to Union blockades. Furthermore, the long southern coastline, while an asset for covertly moving desperately needed provisions, proved to be very difficult to safeguard.⁴³ Lastly, the deficient industrial base and factory production was the South's Achilles heel.⁴⁴ In the end, the North won the war because they were able to leverage their strategic advantages in economics and military capabilities against the several southern vulnerable points to claim victory. Technology was the enabler, and

temporal acceleration was the resulting effect. Americans, for the first time in their short history, began to see strategic value in speed and temporal compression.⁴⁵

Technology continued to influence American perceptions of time and speed well into the next century. Gray noted many instances where “bias towards techno-centric warfare in U.S. strategic culture” existed as seen by the dramatic increase in high-tech battlefield systems and Department of Defense trends favoring transformation through technology.⁴⁶ In her essay “Strategic Culture,” Anita M. Arms noted, “By the mid 20th Century, burgeoning technology was beginning to force a faster pace of life, a ‘speed-up of change’, and the development of a throw-away society.”⁴⁷ Unlike their European counterparts, Americans possessed a “fascination with newness” that translated into people wanting the most updated, innovative, and revolutionary capability that money could buy.⁴⁸ Perhaps this explains why U.S. automobile companies build “planned obsolescence” in their cars, and why citizens replace cars on the average of once every 3-4 years.⁴⁹

The entertainment industry also played a role in reinforcing this mindset. Research demonstrates that television’s pervasiveness has produced a “short term” focus in many western cultures with America leading the way.⁵⁰ Every night, people turn on their televisions and lose themselves in their favorite shows. Usually, within the span of one hour, actors explore, play out, and solve spectacular problems with relative ease and expediency. Innovative programs, such as Fox’s 24 starring Kiefer Sutherland, go one-step further by showing how a U.S. counter-terrorist organization can prevent national catastrophes with global implications within “24-hours.”⁵¹ Consider Figure 1 with respect to the advent of Cable News Network (CNN), handheld / portable communications technology, the explosion of the Internet and the expansion of global information technology on American strategic culture. Today, an attack can happen somewhere in Iraq, and literally within seconds that event can be seen on television via a CNN reporter, sent via email to hundreds of group accounts from a Soldier serving in the

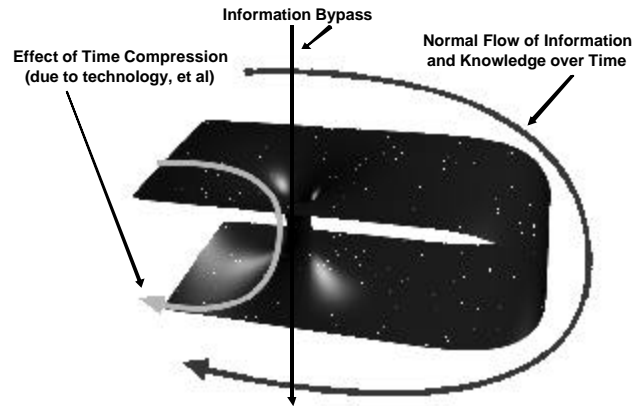


Figure 1. Strategic Effects of Temporal Compression and Speed

Concept Source: Stephen Hawking, *The Illustrated "A Brief History of Time"*

theater of war, and viewed on internet-capable desktops, handheld “personal digital assistants,” and “smart” cell phones throughout the Continental U.S. The business of knowledge transfer has spawned numerous companies focused on getting the right information to the right people upon demand. Every day, that demand grows ever voracious in its requirements for speed, and every day people ask for even more. As detailed in Figure 1, this technological phenomenon creates an anomalous temporal effect on information flow. It is almost as if technology artificially creates an alternative information tunnel that traverses normal space-time, bypassing the standard flow of information and compressing times for decision-making, analysis, and other important aspects of warfighting.⁵² Later sections of this paper will demonstrate the profound effect this phenomenon has on key strategic considerations.⁵³

Important to note is the fact that Americans do not simply expect speed in everyday life. Society, in many cases, demands it. Anita Arms made the correct assessment by revealing how much of the country’s need for speed transfers into individual perceptions and expectations for governmental solutions to strategic problems, and how the cycle time for American strategic decision-making correlates with the intervals between key elections of political figures.⁵⁴ Just like in their television shows, the populace wants quick, easy solutions to the world’s problems. Obviously, this phenomenon of speed and temporal compression has important implications for U.S. diplomacy, strategic decision making and military operations.

The Influences of Dromology and Temporal Compression on American Society and Politics. Both speed and time affect American culture in a variety of ways. One particular school of thought, called “dromology,” investigates the influences and implications of speed and time on society and politics. Created by Paul Virilio, “dromology” is in essence the “science of speed.” This discipline focuses on the aspect of acceleration within the political, social and economic world, keeping in mind the implications of time durations on people and things, and exploring the effects of “temporal compression” resulting from this acceleration.⁵⁵ Recognize, for example, that there is a distinct difference in how various cultures perceive time. In a polychronic society, the focus lies on “the involvement of people and completion of transactions rather than adherence to preset schedules.” In contrast, “a monochronic society views time orientations driven by tasks, schedules and procedures that may assume a life all their own without reference to either logic or human needs”.⁵⁶

Table 1 details how polychronic and monochronic societies compare and contrast, and it addresses the strategic implications of those interactions.⁵⁷ For example, research conducted by anthropologist Edward T. Hall indicated that monochronism is a “by-product of the Industrial

Revolution, but it seems an almost natural form of time because of its prevalence in the Western world.”⁵⁸ Hall further noted that Northern Europe, North America and Japan tend to be monochronic while South and Southeast Asia, Mediterranean and Latin American cultures tend to be polychronic, leaving

China as “somewhere in between.”⁵⁹ As a rule, according to Hall, polychronics “change plans frequently, consider schedules as goals instead of imperatives, and focus on relationship building. Conversely, monochronics “stick to plans, emphasize promptness, and are used to short-term relationships.”⁶⁰ The implications for that calculus can be staggering when planners of military strategy and national policy throw speed-oriented concepts such as “swiftly defeat” and “rapid decisive operations” into the equation.⁶¹

The essential point is this: Cultural notions of monochronic and polychronic societies can have profound differences that, if not taken into account when considering the use of speed in conflict, can affect a nation’s ability to win both the “war” and the “peace”. Now consider the manner in which polychronic cultures view the effects of time and speed. In essence, this type of culture seeks to embrace the “experience of time.” When a temporal event occurs, it creates ripples that have second and third order effects. As these effects ripple outward from the initial point, the polychronic culture will seek to divine the meaning of that event through the lenses of history. These cultures reflect on each ripple, drawing insights and forming opinions based on what they saw in previous ripples of history. Each new effect that results as a consequence of the new ripples adds another layer of thought and reflection for polychronics, so their decision cycles are much slower to respond to changes in their environment.

	Polychronic	Monochronic
Attributes	<ul style="list-style-type: none"> - Process can end without a clear winner - Issues addressed in parallel - Quality of time more important than accomplishments made - Time is circular, to be experienced - Agendas mapped to history 	<ul style="list-style-type: none"> - Process can result in measurable, zero-sum progress - Complete one issue at a time - Agenda mapped to the future - Issues addressed sequentially
Implications	<ul style="list-style-type: none"> - Temporal acceleration and time-dominance approaches appear aggressive - Frustration occurs when historical issues not adequately addressed - Diverging views of progress and unclear paths to conflict resolution 	<ul style="list-style-type: none"> - Misunderstand or ignore adversary’s intentions - Frustration when schedules are not adhered to - Optimizes time dimension - Issue resolution defines conflict resolution

Table 1. Time Orientations and Strategic Interactions

Source: Kevin Cunningham and Robert R. Tomes, “Space-Time Orientations and Contemporary Political-Military Thought”, *Armed Forces and Society*, Vol 31, No. 1, Fall 2004, pp 124-126

Figure 2 offers a visual representation of that perspective.⁶² In this case, speed and temporal acceleration are seen as unfavorable. Inversely, the United States, being a monochronic culture, tends to desire a strong push for agendas, temporal management, and thus temporal acceleration / compression. Historical analysis and reflection may be superseded by the need for immediacy. Speed and temporal acceleration are seen as good in these cases. Therefore, it is easy to see, in both cultures, how temporal thinking regarding compression and acceleration can affect political and military decision making.

Virilio's works are critical towards understanding the consequences of temporal and scalar effects. He indicated that the concept of dromology tended to operate in parallel to the political economy of wealth because "speed had been central to the organization of civilizations and politics."⁶³ Virilio also made the observation that the "pursuit of wealth and power in the Western world has largely been allied to the pursuit of greater

speed. But this acceleration of speed has had largely detrimental consequences on the public sphere and on the erosion of the democratic process."⁶⁴ In addition, Virilio's research contended that a direct link exists between new technology and temporal compression in that advances in information and media technologies compress "time distance." This results in a society retaining an image of time that values "instantaneity" and "ubiquity," and this ultimately leads to the further erosion of human processes needed for democratic participation and deliberation.⁶⁵

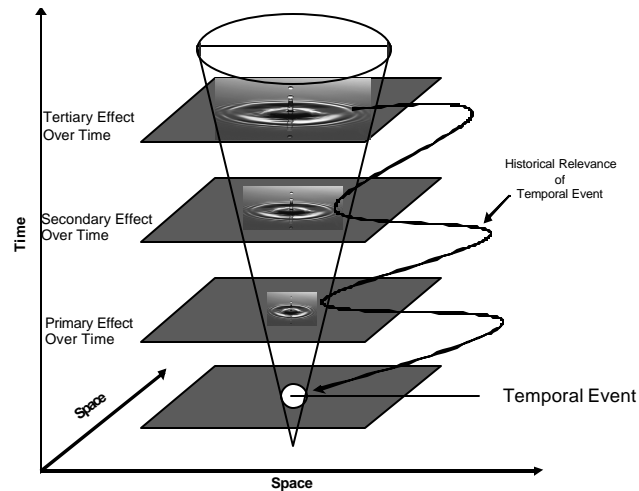


Figure 2. Polychronic view of time and temporal effects

Creative Source: Stephen Hawking, *The Illustrated "A Brief History of Time"*

To offer a visual perspective, Figure 3 gives a graphical representation of Virilio's dromological effect.⁶⁶

Each cone represents time (e.g. the past, present and future) and the distance between them is space. Participants (residing at those levels) view events occurring at both the tactical and strategic levels from that vantage. As information and communications technology enhance

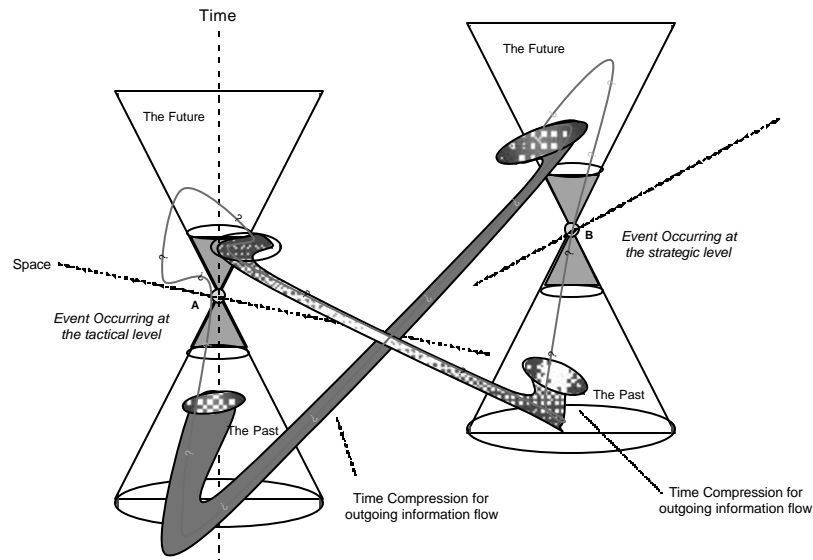


Figure 3. Implications of Temporal Compression

capability, it has the effect of warping processes normally reliant on a certain tempo of speed and time. The two individuals, initially experiencing events simultaneously, are now disconnected. The person at the tactical level acts on the last guidance they received while the strategic party now operates at a different temporal pace, formulating decisions and shaping events that will eventually influence the other levels. The more technology is introduced, the more potential for time compression and the further erosion of vital processes such as decision making and democratic debate.

Prior to the information age, news and knowledge about events occurring at the tactical level would normally take a greater amount of time to reach decision makers at the strategic level. Kevin Cunningham and Robert R. Tomes explained that “international diplomacy occurred at a leisurely pace, limited by the speed of available means of conveying information: couriers on foot, horse, ships, and personal written communiqués between capitols and ambassadors” were the norm.⁶⁷ The slowness of speed had a regulatory effect on how events tended to unfold, and thus diplomacy was viewed as the “art of timing.”⁶⁸ This tempo allowed the processes of diplomacy and democratic deliberation, which occur at a much slower rate, to run their course before the introduction of new data. Since sources of information were few, people had to adjust their chronometric perceptions, and thus their decision-making, to the

information flows of the time. Today new advances in information technology capabilities have compressed that timeframe dramatically, allowing “shortcuts” through space that forms a temporal acceleration effect detrimental to the diplomatic process. In many cases, satellite communications and high-speed internet connectivity provide near real-time access to new information from the tactical and operational levels of a situation. Married to the instantaneity resident in American strategic culture, this causes decision makers to embrace courses of action that can ignore the democratic process, possibly resulting in a form of antidiplomacy that can derail the peace process.⁶⁹

This tracks with Colin Gray’s assessment concerning the apolitical and astrategic character of American warfare, and his assertion that the nation tends to focus on military victory, sometimes at the expense of a lasting peace.⁷⁰ It also recognizes Gray’s position that America’s problem-solving character caused past leaders to believe in the “engineered fix” that ignored temporal considerations leading to policies and military action decisions that “attempt to realize the impossible.”⁷¹ Furthermore, it endorses the assessment that, although America’s technological prowess and its ability to offer temporal compression alternatives for decisions makers may sometimes be “good”, the speed offered by that apparatus could create pathologies in decision making that negatively affect a given situation.⁷² For example, technology in large part helped America win the first Gulf War in less than 60 days. The air campaign commenced on 17 Jan 1991 and the cessation of hostilities was declared at 8:01 a.m., 28 Feb 1991. Aided by CNN, which dispensed the play-by-play of military activities throughout the campaign, American’s began to equate “technologically advanced” and “speed” with “good.”⁷³ Lastly, the populace viewed the relatively low casualty rate experienced in that conflict as a by-product of the nation’s vast technological superiority. Therefore, Americans began to believe that war, however ugly a concept, was sometimes unavoidable, and the expectation that high speed could always bring about the quick, decisive completion of war with extremely low casualties should be the norm. The nation’s impatience and sensitivity to war casualties are reflective of its preoccupation with speed and temporal compression.⁷⁴ Studies conducted by author Theo Farrell supports this observation regarding casualty aversion. In his paper, “Strategic Culture and American Empire,” Farrell explained that casualty aversion blossomed in Vietnam and has remained a factor in other conflicts to include Somalia and Kosovo.⁷⁵

The piquancy with speed and time remains immersed deeply within the American psyche. Every day temporal and scalar perspectives influence American ways of thinking, direct behavioral patterns, shape cognitive insights and worldviews, and drive socio-political

processes. By cosmic design or serendipity, these influences also shape how Americans employ the use of force against national security threats. Therefore, it is important to reflect on the dimensions of speed and time in war, and glean insights for managing them in the strategic context.

Speed and Time Assayed

Research presented so far emphasized both the nebulous (future) and immemorial (past) nature of time. This foundation makes it possible to codify time as a “Quantifiable flow governed by the Uncertainty Principle in which events, some being manageable, navigate between the frames of the unchangeable past and the unknowable future.”⁷⁶ Likewise, it is now possible to define different types of speed, narrowing them down into five scalar categories: 1) Tactical Speed, 2) Operational Speed, 3) Strategic Speed, 4) Decision Making Speed, and 5) C4ISR & Technology-Introduction Speed.

Tactical Speed: This scalar classification typically concerns maneuver at the point of engagement with the enemy where, if used effectively, it can produce tactical advantages for offensive and defensive efforts.⁷⁷ Tactical speed usually concerns the survivability of tactical forces engaged in the close fight, but its use can sometimes create strategic effects. The term is often used synonymously with agility on the battlefield.

Operational Speed: This scalar focuses on temporal and scalar influences at the operational level of conflict. It concerns speed in planning and execution of campaigns and major operations in support of strategic objectives within a theater, and speed in regards to the maneuver of large forces once they arrive in the theater of operations.⁷⁸

Strategic Speed (National and Theater): This scalar is more difficult to codify than the other types. At the national level, one can view strategic speed as “the rapid orchestration of ends, ways and means to deliver strategic effects.” This can include the elements of national power, strategic responsiveness and national agility. Another definition for strategic speed is “the ability to rapidly make decisions of far-reaching importance.” This touches on the political quality of strategic speed. From the military perspective, strategic speed is “the ability to move significant, joint combat power anywhere around the globe.”⁷⁹ This embraces the idea that U.S. military force must be rapidly deployable, seizing and maintaining the initiative in any fight, anywhere, at any time.

Decision-Making Speed: This scalar concerns the ability to make relevant and accurate choices that can have an effect across all three levels of conflict (e.g. tactical, operational and strategic) in a timely manner. Decision Making Speed is challenging. As crises and

transnational threats continue to appear virtually overnight, Decision Making Speed will continue to be one of the most important dimensions concerning speed and time.

C4ISR and Technology-Introduction (Intro) Speed: This final scalar covers two important dimensions. First, it addresses the relative speed in which entities deploy and orchestrate sensors and information technology to move critical knowledge between key decision makers enabling them to make faster choices. In this way, this type of speed seeks to facilitate the creation of desired effects throughout the levels of war. C4ISR speed also considers the rate in which new information and sensor technology arrives to the fight and their impact on those operations. Although this type of speed retains a synergistic relationship with Decision Making Speed, it is not a subset of that scalar, as subsequent cases will allude.

Strategic Temporal and Scalar Pathologies in Combat: Cases and Examples

Obviously, there is some utility in employing each of the five types of speed in conflict. Tactical speed remains critical for maneuver and is a primary tenant of Special Operations where delays expand vulnerabilities that can prevent special operators from gaining superiority over the enemy.⁸⁰ Decision-making speed can also be important at a variety of levels, regardless of whether the decision is made in the heat of an air-to-air fighter engagement or after a terrorist attack on a nation where failure to move quickly can convey a message of weakness to an adversary. Nevertheless, embracing the idea that speed is universally good in every situation can lead

to failure. Figure 4 shows speed and time in a complex strategic context. An environment described as VUCA presents many opportunities where the improper use of speed could ultimately affect the realization of national strategic objectives. Perceptive leaders and planners will comprehend the

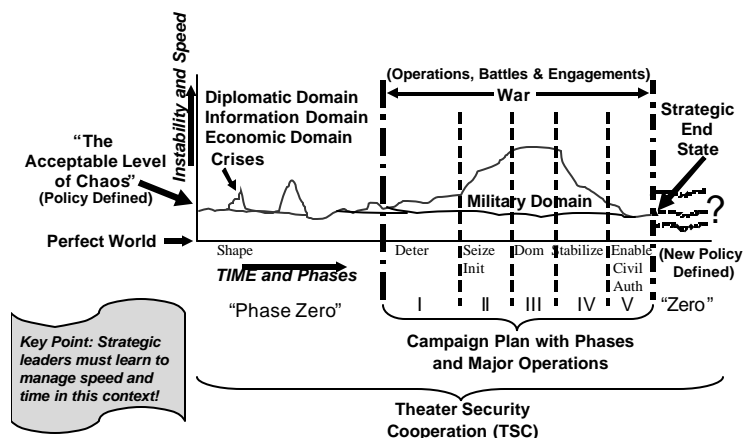


Figure 4. "The Acceptable Level of Instability" (Global, regional, and crisis context)

Source: "Land Power" – Joint Ops 5 (ASAP Course – USAWC 2006)

potential pathologies associated with speed and time in war, and they will be empowered to manage those dimensions in their operations more effectively. Of greater importance is the idea that leaders must understand the challenges that can result from failing to recognize those problems. Rigorous examination of several key military engagements has identified at least eight pathologies worthy of consideration.

Problem #1: Inappropriate Speed Can Adversely Impact Military Operations. In “Transforming for the Chaordic Age,” F.G. Hoffman theorized that “military force design will stress greater responsiveness, strategic mobility, and tactical speed.”⁸¹ Unfortunately, although U.S. National and Military strategies advocate the use of speed in operations (e.g. swift, rapid, decisive force), it is possible that speed can negatively affect service organizational transformation, force structure, and Phase IV and V operations. Consider the following examples.

The Army is moving to a Modular Force to meet the Secretary of Defense's requirement of “transforming the force.” However, unlike Services such as the Air Force or Marine Corps, the Army cannot logistically deploy significant forces into a theater of operations in less than 60 days depending on the capabilities mix needed. This is due in large part to the Army resourcing a significant portion of its Force Structure in the Reserve Components.⁸² Critical reserve component units such as Civil Affairs and Military Police Internment units are not available in the crucial first thirty days of an operation.⁸³ This dynamic creates a possible capability gap for a Joint Force or Joint Task Force Commander, one that can be highly problematical.

Another illustration demonstrates that “light, lean and lethal” forces (e.g. speedy) sacrifice logistics support for speed. In Operation IRAQI FREEDOM, the desire for rapid movement through southern Iraq caused an anomaly where military operations outpaced logistics support. This led to problems much later in the campaign.⁸⁴ The looming threat of China offers an example of a potential conflict that will require “Continuous Concentric Pressure” (larger forces that require longer times to deploy and erect operations) rather than “Rapid Decisive Operations.”⁸⁵ This leads one to ask whether war planners are postured for the right type of war, and how will speed and time play out in that scenario.

Yet another instance makes evident that speed forces a compression of military units, and this causes those units to orient more on actual war fighting at the expense of planning for Phase IV and V operations. A historical example of this is the evolution of the Army Headquarters (HQ) since World War II. On 8 June 1942, the U.S. Army created a theater level HQ (European Theater of Operations U.S. Army- ETOUSA) which assumed command of all U.S. Army forces in Europe.⁸⁶ ETOUSA had two years to plan for the occupation of Germany,

and this left Army Groups and below free to execute battle operations without sacrificing manpower and resources for future planning. As today's U.S. Army HQ structure becomes more compressed, it has lost that ETOUSA function but has not lost the corresponding ETOUSA responsibilities. The result is a smaller HQ that is multi-tasked to fight the current war and plan for the Phase IV and V mission. Although the "plug in" of Interagency support can help alleviate this issue, the concern remains that the interagency team may not match the speed of military operations. Therefore, speed has the impact of offsetting planning considerations especially for interagency involvement in Phases IV and V. For example, the U.S. military moved so quickly in the 1991 Gulf War that diplomacy (and diplomats) did not keep up, and this fact contributed to an unsatisfactory peace.⁸⁷

Problem #2: Speed Can Erroneously Build the Case for Preemption. Throughout the long stand off with the former Soviet Union, U.S. forces remained primed and ready to fight "World War III." The demise of Communism brought with it an easing of world tensions, and the U.S. military reciprocated by decreasing its defensive posture. September 11th became the watershed event changing that mindset, and this compelled military and political leaders to rethink their force posture and doctrine regarding the use of American firepower. The focus migrated to a concentration on "strategic speed" and the perspective of quickly mobilizing military power to negate threats. The National Security Strategy of the United States of America vividly espouses the need for preemption based on the immediacy of today's threat levied against the nation. One paragraph stands out in particular by declaring, "The United States has long maintained the option of preemptive actions to counter a sufficient threat to our national security. The greater the threat, the greater the risk of inaction and the more compelling the case for taking anticipatory action to defend ourselves, even if uncertainty remains as to the time and place of the enemy's attack. To forestall or prevent such hostile acts by our adversaries, the United States will, if necessary, act preemptively."⁸⁸ Now armed with the policy of preemption and "preventive war," there is a potential for leaders to employ mobile and light forces to attack an evasive enemy on short notice. This prospect could, in the words of defense analyst Thomas Barrett, stimulate "world fears about an American military that is reckless, trigger-happy, and prone to unilateralism."⁸⁹

Problem #3: Speed Compounds Casualty Aversion and "Winning the Peace" through Failed State Prevention. In his September 2001 monograph for the Army Strategic Studies Institute, Dr. Steven Metz posed concerns for the next QDR generation. He said: "The most enduring dilemma for U.S. strategists had become finding ways to avoid a Vietnam-style loss of public and congressional support for military engagement or a specific military operation.

Speed was seen as a solution.”⁹⁰ Since U.S. military success in Operation DESERT STORM in 1991, American leaders began to view speed as a universal good for possibly avoiding the brutalizing and corrosive effects of war; politicians executed a push for even more “rapid - dominance approaches to warfare” to seize a fast victory wherever possible.⁹¹ Moreover, that perspective began to proliferate across the Department of Defense and Interagency community, setting a dangerous precedent. Dr. Metz explained that, “strategic, operational and tactical speed was thought to minimize U.S. casualties;” this mindset might facilitate political (and publicly accepted) decisions to use military force in crisis or short term engagements.⁹² Furthermore, this condition has the potential to lead to faulty reasoning with respect to crises since not all crises are amenable to speedy solutions using military force predominantly.

Using many of the political speeches given by President George W. Bush and others during the ramp up to the 2003 war as a guide, research performed for the *Journal of American Culture* underscores how leadership attempted to use political rhetoric to control time and thus the speed of the pending conflict. The requirement for a “quick and painless war” drove the language of political speech-making and helped to shape an argument for rapid, decisive action in Iraq.⁹³ The problem with this line of thought is that it discounts the idea that a lasting peace sometimes requires a slower tempo in order to manifest. Speed may end the initial hostilities, but over reliance on speed can spawn conditions that fail to achieve national and strategic objectives. Jeffrey Record addressed this issue in “Collapsed Countries, Casualty Dread, and the New American Way of War,” wherein he questioned how much effort American leadership is prepared to put into political and economic “nation building” or “nation-tending” of countries “toppled by American military power.”⁹⁴ Even with so much emphasis on employing speed to get to the fight and win, it is also important to plan for the creation of a sustainable government that occupation forces will put into place once the hostilities cease. The lessons American military planners learned in OPERATION IRAQI FREEDOM support this. Nonetheless, the belief that “speed works all the time” lingers in military circles.⁹⁵

The improper employment of speed may also cause planners to miss opportunities for parallel or sequenced teaming between the Department of Defense and the interagency. This partnership is necessary towards laying the groundwork for nation building; failure to synergize that effort could lead to a reciprocal failure of setting conditions for strategic success.⁹⁶ Another factor to consider is speed and time in relation to the political process of other nations involved in Phase IV operations. A large part of U.S. national strategy orients on the prevention of failed states, as those tend to be hotbeds for terrorism. Therefore, the American demand for “conflict prevention and stability operations” will continue to grow at an increased rate as well, hoping to

deter failed state creation.⁹⁷ At times, the focus on preemption speed and preventive war may not mesh with the political processes of likely coalition countries. U.S. strategic leaders hope will stand with American fighting forces. For example, Cunningham and Tones' research into space-time orientations and political thought recognizes that Persian Gulf cultures measure political progress quite differently than other Western cultures.⁹⁸ Failure to acknowledge this dynamic in the planning process can cause military leaders to employ a tempo that outpaces the political evolution. In effect, speed and time can potentially "compound foreign policy" efforts creating "spatial-temporal angst" and possibly "limiting our understanding, empathy for, and cultural insights" into other nations involved in the peace process.⁹⁹ The result could be strategic failure.

Another possible pitfall of speed relates to technology-assisted "bloodless warfare." In cases where the military uses tactical and operational speed so well to win the battle, there exists the risk of creating the false impression that speedy warfare equates to bloodless and risk-less conflict. Should political leaders equate these, they may assume that speed will always lead to a prompt, painless and successful outcome. This would be a dangerous assumption. Liddell Hart once wrote, "The object of war is to attain a better peace."¹⁰⁰ However, speed alone in itself does not necessarily lead to a better peace. In some situations, it can lead to opposite outcomes.

Problem #4: The Paradox of Strategic Speed and the Application of Military Power.

Sometimes the overwhelming need to get somewhere fast clouds strategic thinking about the employment of forces once they are in place. For example, Dr. Metz's monograph discussed political problems with the U.S. Army's Future Combat System (FCS). FCS has been marketed as a major contribution to Secretary of Defense Rumsfeld's mandate for transformation, and the Army expects FCS to be a vehicle configurable for different missions of vital interest to Army leadership. However, a key problem remains in that "The Army has not yet developed a full range of strategic or operational concepts to explain precisely what the Objective Force will do once deployed."¹⁰¹ One has to ask the question, "What drives this train: the need for an improved combat capability or the need for speed?" Once the Army determines the Objective Force strategic and operational concepts, then it would be time to explore possible solutions such as FCS. In this case, speed convolutes strategic thinking regarding the operational art.

Another issue concerns speed in the context of the idea "getting there first with the most." Sometimes, when the sole or overriding consideration is speed, planners can turn a valid concept such as getting to the fight "first with the most" into a recipe for disaster. David Tucker, in his Autumn 2000 *Parameters* article "RMA and the Interagency: Knowledge and Speed vs.

Ignorance and Sloth,” discussed the benefits of Strategic Preclusion: A process that involves marshalling forces rapidly and moving them to points of conflict quickly.¹⁰² Tucker explained when the American military did this in DESERT STORM, “Iraqi leadership saw a formidable force building and moving inexorably toward them.” The goal was to reduce risk to friendly forces by creating psychological domination over an enemy. That psychological destabilization of the Iraqi forces was a crucial step toward collapsing the enemy’s will to fight, and speed was vital in that effort.¹⁰³ However, to focus overly much on speed can preclude the strategic effect planners seek to achieve.

Tucker also made an interesting observation regarding disconnects between the strategic speed of policymakers and the operational speed of military campaigns. Due to organizational stovepipes and competing cultures between the Department of Defense and other agencies, a mismatch often occurs where military operations run so fast that they forestall the proper coordination of policy. When this happens, Tucker commented, those operations “will be ineffective no matter how successful militarily, because they will unfold before policy can properly shape them. Worse, operations may present policy makers with a *fait accompli*, and thus determine policy.”¹⁰⁴ An excellent example, as noted above, was the end of Gulf War 1991 where no state department people were available for the end of hostilities. Lastly, decision makers recognizing this character in military operations “could elect to hesitate or fail to approve operations or may seek ways to slow them down.”¹⁰⁵

Another similar example comes from Antulio J. Echevarria’s whitepaper entitled “Rapid Decisive Operations (RDO): An Assumption-Based Critique.” Echevarria identified a faulty assumption in RDO whereby he argued that the National Command Authority sometimes might not understand the military’s need / desire for speed in varying operations. At times, political leadership may see a “graduated response as being more appropriate for any number of reasons, such as the desire to avoid escalation to nuclear weapons or to keep allies and coalition partners in (the) fight.”¹⁰⁶ Once more, examples such as these attest that the need for speed in military operations can produce a mismatch with political and decision-making speed. Planners who fail to recognize this dynamic do so at the peril of mission success.

Problem #5: C4ISR Speed Accentuates the “Fog of War.” At first glance, viewing C4ISR speed as good may seem make perfect sense; instantaneous knowledge flow equates to faster decision making. However, by orienting towards a more nuanced vantage, one can see that things are not always as they appear. Virilio clearly identified with the instantaneity of technological speed and its associated problem sets. In his view, information technology eliminates distance and undermines both critical analysis and democratic politics, thereby

damaging the requirement for traditional politics.¹⁰⁷ Tucker complemented this line of reasoning by indicating yet another major flaw in relying on this type of speed: The ubiquitous nature of C4ISR capabilities can generate an overwhelming amount of information that smothers decision makers in noise, friction and uncertainty during conflict.¹⁰⁸ Since information is available upon demand, strategic leaders and military commanders may actually delay their decision making until they obtain “perfect knowledge” so they can make a “risk-free” decision.¹⁰⁹ In some instances, those leaders may choose to completely ignore the information due to “knowledge over-saturation,” and this defeats the primary reason for having the technology available: To improve clarity of thought for relevant decision making.¹¹⁰ Excessive reliance on C4ISR speed also ignores the fact that the “enemy gets a vote” and a “thinking” adversary can and will do everything in its power to create uncertainty and fog with the goal of imposing his / her will regardless of overwhelming American military capability.¹¹¹ Therefore, it is possible that this type of speed can actually exacerbate the “fog in war” advocates claim it abolishes. Indeed, that over-reliance can pressure decision makers to develop unrealistic expectations concerning technology and speed, forcing them to lose sight of the nuanced art of command.¹¹² Another issue with C4ISR speed concerns the media and political / military decision-making. The so-called “CNN Effect” can directly influence military chains of command.¹¹³ For example, not only can technology permit news to travel faster than military orders, it can also allow leaders to skip various levels of military chains of command at will. If news of casualty rates travels faster than orders, future political leaders might embrace the temptation to interfere with military decision-making based on media inputs.¹¹⁴ Clearly, prospective military strategists will have a variety of considerations they must incorporate into their mission planning calculus.

Problem #6: Technological Advances Yield Speed and Complexity. Each new procession of technological advance on the battlefield brings with it an additional level of challenge for senior leaders and planners. Even simple, every day “necessities” such as electronic mail and cell phones can influence unity of effort and chains of command, effectively ruining chains of authority and hierarchy. This is also true for more advanced technologies. One school of thought postulates that breakthroughs in Directed Energy Weapons (DEWs) capabilities, robotics, and autonomous / semi-autonomous computer-driven technologies on the battlefield significantly increase the speed of battlefield events, causing the many aspects of warfighting to “leave the realm of human senses and cross outside the limits of human reaction times.” This implies that many on-the-drawing-board technologies may be “too fast” for cognitive thought (by humans) and will “create an environment too complex for humans to direct.”¹¹⁵ “Smart technologies” such as “self-healing networks”, intelligent sensors, and machine-to-machine

integration as identified in the Air Force's "Cursor on Target" initiative, will make humans more and more remote from the process, and this will pose critical issues and decisions for future planners. F.G. Hoffman paralleled this thought in "Transforming for the Chaordic Age" when he said: "American strategic culture incorporates technology and innovation as a critical dimension of our overall preeminence, but it is neither an automatic passport to strategic victory nor a cure-all for weaknesses in other dimensions."¹¹⁶

Problem #7: Speed Can Foster Dysfunctional Decision Making. Americans live in a time in which events unfold with unparalleled speed, and this evolution continues to grow exponentially. The times of terrorist attack warning and decision-making are getting shorter, and many people believe that faster decision-making is better. However, there are situations when decisions should be weighed over time depending on the complexity of the issue being explored. Arden B. Dahl discussed this aspect of decision making speed in "Command Dysfunction", where he argued that certain applications of decision-making speed could actually cause decision paralysis when clarity is required.¹¹⁷ David Tucker also confirmed this in his work. He agreed that fast decision-making is necessary in some cases, but believed that "some crises, such as a developing complex contingency operation involving the UN and a regional political or military alliance as well as the (Interagency) may require a slow decision making tempo. For shaping and preparing aspects of strategy in these types of situations, speed will be less important; especially if it impairs coordination."¹¹⁸ Tucker also noted that, at the strategic level, decision-making is constrained by the need for consensus. This is especially true when one adds politics to the calculus, a process known for its lag time.¹¹⁹

Contemplate once again the issue of strategic preclusion mentioned earlier. Leveraging the comparative strengths of speed, C4ISR speed in particular, American military forces can widen their aperture of the battlefield and shape that area more efficiently. Speed in combination with strategic preclusion can permit the synchronized application of military force against adversaries in a manner resulting in their disintegration.¹²⁰ For preclusion to work, planners must first create the conditions for successful interagency decision making that produces the effect of "coordinated rapid response to emerging problems" mapped to battlefield situations.¹²¹ The inclusion of the Interagency is vital towards synchronizing strategic speed and decision-making speed in war as it allows military forces to multi-task anomalous situations that emerge from operations. As Americans learned in Operation IRAQI FREEDOM, strategic preclusion may overwhelm some enemy forces while simultaneously creating smaller pockets of insurgency. Friendly forces will face multiple tasks spanning the spectrum of military operations, and they will need the interagency team to complete some of those tasks and

secure the peace.¹²² In short, both decision making speed and strategic speed will not necessarily be effective unless planners achieve interoperability with respect to the elements of national power. Moreover, they must also account for variable time and speed across the Interagency community and, where applicable, the coalition team.¹²³ Lastly, planners will need to weigh the relative importance of speed in these cases.

Problem #8: Speed, Time, and the Adaptive Enemy. Hoffman stated that Americans “have not yet met an adaptive adversary with the will and capability to compete with us on his or our terms” and that U.S. “technological superiority may prove less resilient than we imagine.”¹²⁴ Since the fall of Communism, America has been relatively successful when plying its formidable military power against its enemies. Speed has been cited as one of the most important aspects of that military capability in many situations, especially in cases of preemption or preventive war. However, future hostilities against non-state actors may prove to be a greater challenge. What will happen when America applies speed and firepower against an adaptable foe capable of operating as a “lateral network which can quickly learn from engagements, anticipate U.S. strategy, and rapidly self-organize after being attacked?”¹²⁵ Will speed remain a critical advantage against such an adversary? As Cunningham and Tomes discovered, the rapid-dominance based belief that speed and time used against an enemy “through surveillance and strike capabilities will eventually produce the collapse of the opponent’s decision-making capability” may not always work and might actually undermine complete - or satisfactory or lasting - victory. In light of this, one might consider the Iraq War of 2003. In the early days of the operation, American forces used speed to engage and destroy a large portion of conventional Iraqi combat capability.¹²⁶ However, unlike U.S. actions in World War II, friendly forces in IRAQI FREEDOM did not linger to fully secure territories and establish “defeat” firmly in the minds of the enemy. Instead, they chose the allure of speed and continued to move forward to claim Baghdad. Shortly thereafter insurgents who did not realize they had been beaten rose up from the ashes and continued the fight against American forces.¹²⁷ In addition, this swiftness resulted in a form of “catastrophic success” that failed to achieve the peace and thus the national strategic objectives.¹²⁸ This phenomenon raises two critical points about speed: 1) The enemy forces and population must understand that they have been beaten. 2) Despite the crushing capability of precision weapons, superior battlefield awareness, and the use of elite special operations forces, speed may allow rapid maneuver to break conventional enemy forces and still fail to set the conditions for strategic victory.¹²⁹ The American way of war, while often self-imposing temporal and scalar pressures on U.S. and allied / coalition military action, sometimes neglects to recognize that an enemy may be impervious to oscillations

resulting from those pressures.¹³⁰ True, the management of tempo in battle remains a known asset.¹³¹ However, if U.S. strategic leaders fail to start planning today for the adaptable enemy skilled at managing temporal and scalar shortcomings against friendly forces, American troops may find themselves vulnerable and exposed in future combat.¹³²

The New Strategic Calculus

Each dimension of speed carries with it conceivable pathologies that, left unconsidered, can adversely influence the use of force by American decision makers. Therefore, senior leaders need a new way of thinking about the impact of speed and time in conflict, and a strategic calculus to facilitate their understanding of the complexities associated with those aspects. Figures 5 and 6 offer a model recommended for consideration. Future leaders and planners should consider analyzing the effects of speed and time in war against the

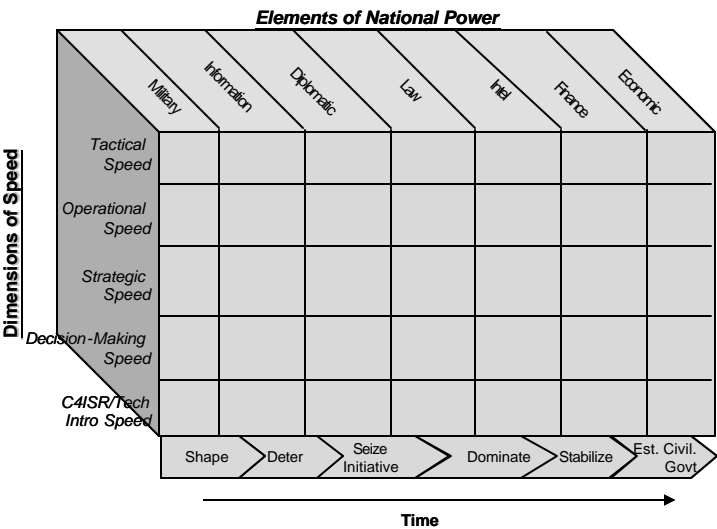


Figure 5. Scalar and Temporal Strategic Calculus Model Analytical Tool

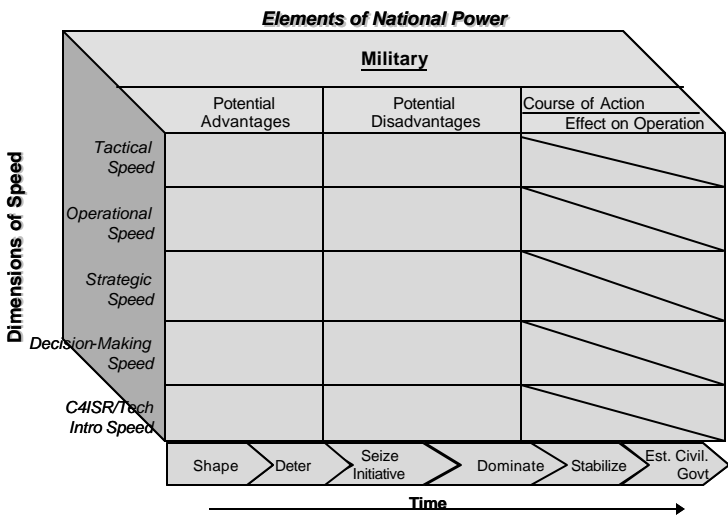


Figure 6. Scalar and Temporal Strategic Calculus Model / Sub-Category Analytical Tool

elements of national power and the operational phases of a campaign's level of effort.¹³³ The model takes each component of speed and allows one to create a series of questions that will help illuminate the implications of these dimensions on decision making, course of action

development, and campaign planning. Figure 6, for example, allows planners to select the element of national power “military” and whatever sub-category they desire. Using the model, planners can navigate through varying levels of analysis to determine the advantages and disadvantages of speed and time on a variety of decisions. Suppose a planner wants to get a perspective on tactical speed in an operation. That individual would select “Tactical Speed,” “Element of National Power - Military, Sub-Category: Nation Building.” Now they can form queries about possible issues regarding tactical speed, such as “What are the advantages or possible pathologies of tactical speed with respect to nation building in the ‘Stabilize’ phase of the campaign?”

By employing this Socratic method of thinking and analysis, planners can explore the issues in depth, determining both the effects they desire and scrutinizing possible courses of action for applying speed and time in the

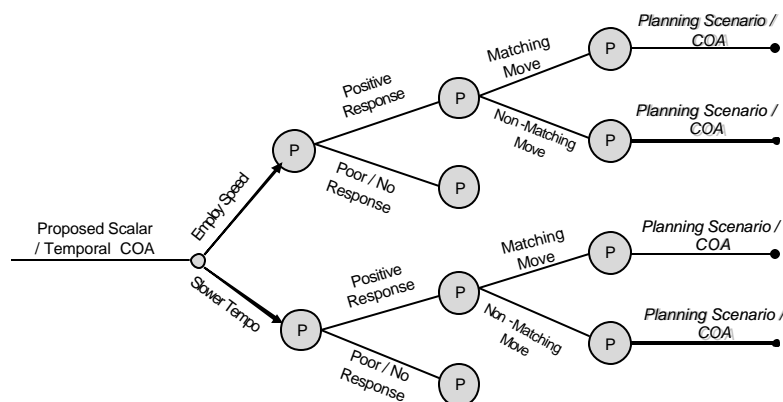


Figure 7. Scalar and Temporal Strategic Calculus Model / Probability / Course of Action Analytical Tool

Creative Source: George S. Day and David J. Reibstein, Wharton on Dynamic Competitive Strategy

operation. Should the planner wish to go further, he / she can use Figure 7 to test the proposed course of action against the probabilities of friendly and enemy reactions to changes in the scalar and temporal calculus.¹³⁴ Planners can investigate a variety of problem sets reflecting the actions of numerous actors (e.g. coalition, enemy, interagency, etc.), limited only by their cognitive abilities and willingness to explore the possible scenarios.

- How will speed and time influence risk in the operation?
- What is the value-added of speed at each level of the operation?
 - How will speed and time be an advantage / disadvantage to the operation?
 - How can strategic leaders minimize the disadvantages of speed and time in the operation?
- What are the possible applications of speed and time that will erode the advantages?
- What temporal and scalar effects will cause the adversary to accept the imposition of your will?
- What temporal and scalar events will create the desired effects the national objectives require?
- What sequence of events can planners employ to best leverage the advantages of speed while mitigating the risks?
- How will the inclusion (or omission) of other actors (for example, the interagency) impact or be impacted by (type of) speed?

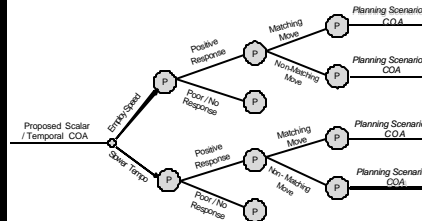


Figure 7. Scalar and Temporal Strategic Calculus Model / Probability / Course of Action Analytical Tool

Creative Source: George S. Day and David J. Reibstein
Wharton on Dynamic Competitive Strategy

Table 2. Temporal and Scalar Planning Considerations for Course of Action Testing

- How can the enemy order effects to gain relative advantage, and how can friendly forces negate it?
- What are the political forces influencing the campaign and how will speed influence them?
- What factors or forces will influence speed and time in combat operations? Nation-building operations?
- Which types of (speed / time) actions will elicit a response and which ones will not?
- To which actions will coalition forces likely respond? Enemy forces?
- What are the tradeoffs of speed vs. greater political buy-in and legitimacy of the coalition?
- Are there differences in the speed of reactions depending on the nature of the action, nature of the actors, and nature of the enemies affected?

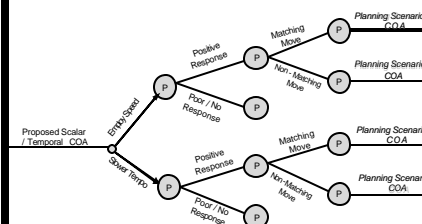


Figure 7. Scalar and Temporal Strategic Calculus Model / Probability / Course of Action Analytical Tool

Creative Source: George S. Day and David J. Reibstein
Wharton on Dynamic Competitive Strategy

Table 3. Temporal and Scalar Planning Considerations for Course of Action Testing (cont.)

Table 2 and Table 3 offer a sample of the types of queries a planner can explore. Once a reasonable amount of scenarios have been evaluated, scalar and temporal considerations can

now be factored into the existing campaign planning process employed by Combatant Commands and the Joint Staff yielding a wider, more nuanced perspective of the Battlespace.

An unknown scientist once said that nature does not easily reveal her secrets. However, she will respond to the correct line of questioning. The Strategic Calculus Analytical Tool offers a way of thinking about the scalar and temporal aspects of war that is both straight-forward and nuanced. It enhances critical analysis while simultaneously allowing for scenario development and tiered testing of ideas relating to speed and time in war.

Precedence for this tool exists based on research conducted by Larry K. Wentz and Lee W. Wagenhals of the George Mason University C3I Center. In their paper, "Effects Based Operations for Transnational Terrorist Organizations: Assessing Alternative Courses of Action to Mitigate Terrorist Threats," Wentz and Wagenhals employed a probability model that explored the relative impact of individual and multiple actionable events on reducing the impact of terrorist events. The model offered a temporal analysis comparing reactive and preemptive strategies in response to terrorist activities. Though not designed to be prescriptive, this tool demonstrated that military campaigns alone would not necessarily be effective in mitigating future terrorist attempts. In contrast, it showed that the synchronized leveraging of multiple elements of national power (e.g. legal, financial, political, and military, et al), managed at a variable rate of speed and timing, had greater success in deconstructing terrorist organization's ability to conduct operations against nations by giving bureaucratic processes time to build coalitions against terrorism.¹³⁵ As Antulio Echevarria indicated, the integration of the elements of national power, once engaged, can produce tremendous synergy vital towards achieving military and national objectives.¹³⁶ Temporal and scalar concerns are relevant issues, and models such as these can aid the astute national security professional in understanding the strategic implications of speed and time in war. That insight can be the difference between a lasting peace and strategic failure. With hope, military and interagency planners will take this to the next step and incorporate models such as these into the joint / national crisis action and adaptive planning frameworks currently in use.

Conclusion

There is much more to "speed and time" than meets the eye. The absence of scholarly debate on their relative values lends credence to the idea that American culture perceives speed as being a general "good." Since this can lead to varying pathologies of a strategic nature, comprehending the temporal and scalar implications of conflict remains vital for both politicians and military leaders who wish to shape the strategic landscape of American warfare.

The proposed strategic calculus for managing temporal and scalar mechanics in war gives national security professionals a more nuanced way of thinking about speed and time that has heretofore been unavailable. By considering the use of variable speed and tempo in certain situations, it offers a method for planning that can synchronize speed and time with the other elements of national power to win conflicts. Moreover, the calculus provides a unique perspective on the art of war, and those leaders who use it will be further empowered to ask relevant questions that refine and enhance warfighting concepts. In addition, by evoking intellectual debate concerning the implications of speed and time, the model can enhance long-range planning and help leaders achieve national strategic objectives in a variety of scenarios. Decisions gleaned from this understanding can have a profound impact on how our nation will fight in the future.

Arguably, some people will have more difficulty coming to terms with this concept than others will. The appeal of traditional notions will remain strong. Consider the most recent and compelling example from Iraq. On 13 March 2006, Michael R. Gordon and Bernard E. Trainor published an article in the *New York Times* entitled “Dash to Baghdad Left Top U.S. Generals Divided.” Gordon and Trainor indicated that Lt. General William S. Wallace, in command of the Army’s V Corps headed to Baghdad, was nearly fired by General Tommy R. Franks for his desire to “delay their advance on the Iraqi capital to suppress the Fedayeen threat in the rear.”¹³⁷ Later in the article, the authors note that General Frank’s plan to seize Baghdad “relied on speed” at the expense of manpower.¹³⁸ Did the “need for speed” overshadow a possible need for “variable speed” in terms of an operational pause? Just as Copernicus and Galileo ushered a paradigm shift into a world convinced that a geocentric theory of reality was closer to the truth than that of a heliocentric perspective, perhaps we may now try to usher in a rethinking of speed and time in war.¹³⁹ Clearly, mono-dimensional ideas about speed are not sufficient at the strategic level.¹⁴⁰ Although numerous lessons learned from Operation IRAQI FREEDOM and other conflicts reflect the value of speed in multiple dimensions as “good and necessary,” perhaps this research demonstrates that a compelling argument for slower or even variable tempo may apply in some cases.¹⁴¹ Upon consideration of the pathologies aforementioned, analysts who cite speed success stories may choose to re-evaluate their views in light of those situations such as Somalia, Bosnia-Herzegovina, Iraq and Afghanistan, which remain open-ended.¹⁴²

The future remains volatile and uncertain. National security professionals and scholarly institutions should be acutely aware of time and speed’s strategic implications. Further research, analysis, and scholarly debate in this area can bring many of the temporal and scalar

issues in war to the forefront. This may be one of the times where speed is of the essence, and those professionals should take decisive steps soon, before the adaptive enemy gets there first.

Endnotes

¹ Carl Von Clausewitz, *On War* (Princeton: Princeton University Press, 1976). In Book 3 Chapter 12, Clausewitz talks about men, space and time as being vital components for consideration in the activity of war.

² Anita M. Arms, "Strategic Culture: The American Mind", Industrial College of the Armed Forces, (January 1991). "American Strategic Culture" is defined by Colin S. Gray as a way of thinking and acting that "is the product of the significantly unique American historical experience (which) encompasses oscillations between extremes, and these extremes are quintessentially American."

³ *Scalar* is a term derived from physics and mathematics, and the first recorded use of the term was by Sir William Rowan Hamilton (4 Aug 1805-2 Sep 1865). Hamilton was an Irish physicist, mathematician, and astronomer who made enduring contributions to those fields prior to his death. When he introduced the term, Hamilton used *scalar* to denote a quantity typically characterized by a single numeric value or not involving the concept of direction. He used *scalar* to contrast entities that were composites of several other values such as vectors, matrices, tensor sequences (e.g. a generalized quantity or geometrical entity which includes concepts related to scalars, et al), mass, length, speed, etc. The term crosses the boundaries of physics and mathematics frequently. For example, in physics a *scalar* is a physical quantity that does not change under a change of coordinate system (a system for assigning a finite sequence [tuple] of numbers to each point in an n-dimensional space). In this respect, speed is a scalar (ex: 90 kph) and velocity (ex: 90 kph East) is a *vector*. It is not uncommon for people to use the terms of speed and velocity interchangeably. However, they are two very different concepts. Math and physics denote speed as the rate of motion or, more precisely, the rate of change of position commonly expressed as distance (d) advanced per unit of time (t). One can articulate speed in many ways: Meters/sec, Mach (approximately 343 m/sec), and the speed of light in space ($c = 299,792,458$ m/s) and so on. However, velocity is the *physical* quantity of an object's motion determined by both its speed *and* direction, or its vector. The distinction between the two is that speed is a *scalar* quantity due to its association with dimensions of *distance* and *time*, and it is considered the magnitude component of velocity. In Einstein's theory of relativity, speed is also considered to be scalar. Since relativity explores changes in coordinate systems within the domain of space-time, it also addresses the non-relativistic physics of fourth dimensional vectors that include concerns of speed and time. The point, in the simplest terms, is that when people use words such as "speed" and "velocity," they tend to focus on those concepts in the most general sense and this causes them to overlook the nuanced qualities of speed. Therefore, since speed has so many connotations, the term *scalar* will be used for the purposes of this paper to express the expansive quality of speed as it relates to time. The preponderance of mathematical and physics-related information in this endnote is available through the American Institute of Physics (<http://www.aip.org/>) and Wolfram Research Mathworld (<http://mathworld.wolfram.com>).

⁴ "VUCA" is a commonly accepted acronym used throughout the military academic community and services to denote the complex and chaotic environment in which strategic leaders make decisions.

⁵ *Strategic Assessment 1999: Priorities for a Turbulent World* (Institute for Strategic Studies, National Defense University, 1999): 7-17, 19-37. Ellen L. Frost, "Economic Globalization: Stability or Conflict?," and Richard L. Kugler, "Global Political Trends: Integration or Disintegration."

⁶ Jeffrey Record, "Collapsed Countries, Casualty Dread, and the New American Way of War," *Parameters*, (Summer 2002): 17, 18.

⁷ Secretary of Defense, *The National Defense Strategy of the United States of America*, (Washington D.C., Department of Defense March 2005), 2.

⁸ Ibid. *The National Defense Strategy of the United States of America* also talks about this in detail. The document points out that, although the U.S. military remains a force to be reckoned with in regards to the traditional military warfare, it is unlikely that enemies will seek to engage the American military at its point of strength. Unable to compete at that level, enemies will therefore seek to attack where U.S. forces are weakest. This reference was also used as part of the *Quadrennial Defense Review* published in February 2006.

⁹ Thomas K. Adams, "Future Warfare and the Decline of Human Decision Making," *Parameters*, U.S. Army War College Quarterly (Winter 2001-2002); 4.

¹⁰ Temporal Geometry is a theoretical method derived from temporal logic that studies the complexity of temporal phenomenon and events. Events can often be described by their temporal geometry that may include Time Instants, Time Periods, Time Intervals, Durations, Time Positions, etc. This concept is sometimes used in Geographic Markup Language (GML), but it can also apply to other temporal events, such as military operations. More information regarding temporal geometry from <http://csdl2.computer.org/comp/proceedings/time/1996/7528/00/75280004.pdf>; Internet; accessed 1 March 2006.

¹¹ Russell F. Weigley, *The American Way of War: A History of United States Military Strategy and Policy*, (Indiana: Indiana University Press, 1973).

¹² Colin S. Gray, "The American Way of War: Critique and Implications," quoted in Anthony D. McIvor ed., *Rethinking the Principles of War* (Annapolis, Naval Institute Press 2005), 26.

¹³ Ibid., 27. The 12 characteristics of the American way of war as listed by Gray includes the following: Apolitical, Astrategic, Ahistorical, Problem Solving/Optimistic, Culturally Ignorant, Technologically Dependent, Firepower Focused, Large-Scale, Profoundly Regular, Impatient, Logistically Excellent, Sensitive to Casualties.

¹⁴ Professor Samuel P. Huntington, *American Military Strategy*, Policy Paper 28 (University of California: Berkeley Institute of International Studies, 1986), 33.

¹⁵ Ibid., 14-17.

¹⁶ Anthony D. Mclvor ed., *Rethinking the Principles of War* (Annapolis, Naval Institute Press 2005), 63. This idea came from Antulio J. Echevarria II, *Principles of War or Principles of Battle*.

¹⁷ Ibid., 88. This reference is derived from Harlan Ullman, *On War: Enduring Principles or Profound Changes?*

¹⁸ Ibid.

¹⁹ Ralph Peters, "Speed the Kill: Updating the American Way of War," quoted in Anthony D. Mclvor ed., *Rethinking the Principles of War* (Annapolis, Naval Institute Press 2005), 96.

²⁰ Ibid., 97.

²¹ Adams, 2. Adams comments that battlefield knowledge requires speed to exploit that knowledge, and he sees this as "keystone" concepts for the Army's planning efforts. Additionally, he talks about the Army needing two primary types of speed to survive future wars: Linear (across the ground) and Angular (the ability to outthink and anticipate) speed.

²² *The Annual Report on the Army After Next Project to the Chief of Staff of the Army*. (Washington, DC: Department of the Army, 1997). General Reimer makes this comment. General Reimer's POC, Lt Col John Medve, probably created and staffed the report for CSA, but it was signed by Gen. Reimer. The paper also noted that keeping the offensive relies on an American military that retained the ability to strike rapidly, decide quickly and finish wars cleanly with a minimum loss of human life. Clearly, the belief that "speed conquers all" is evident here.

²³ *Knowledge and Speed: The Annual Report on the Army After Next Project to the Chief of Staff of the Army*. (Washington, DC: Department of the Army, 1998). This discussion on the enemy's ability to manipulate time goes to the significant part of the issue. The document highlights that the American ability to deliver strategic response into an area depends on strategic warning, situational ambiguity, force deployment and closure times, early entry lethality, sustainability, success at coalition building, and the domestic political decision making process. Enemies who successfully manipulate time can directly influence the outcomes of these processes, so American planning processes need to account for dimensions time and speed.

²⁴ F. G. Hoffman, "Transforming for the Chaordic Age," *Marine Corps Gazette* 86 (November 2002): 45. President Bush, as referenced by the author.

²⁵ *Army FM-1: The Army*, (HQ Department of the Army, June 2005). The specific quotes from that manual are specific and relevant to note. Section 3-15 states, "The Army's operational concept is seizing, retaining, and exploiting the initiative with *speed*, shock, surprise, depth, simultaneity, and endurance. The operational concept depends on flexible combinations of Army capabilities (combined arms) and joint capabilities (joint interdependence) integrated across the full spectrum of operations through mission command." Section 3-17 focuses on speed in detail. "*Speed* is the ability of land forces to act rapidly. Rapid maneuver dislocates the enemy force and exposes its elements before they are prepared or positioned. Rapid action preempts threats to security. It reduces suffering and loss of life among noncombatants or victims of disaster by restoring order and essential services. *At the strategic level, speed gives Army forces their expeditionary quality. Speed allows Army forces to keep the initiative. It*

contributes to their ability to achieve shock and surprise.” These last two sentences are very important as they clearly articulate the Army’s belief that speed is “good” and strategically vital to Army operations.

²⁶ Wayne P. Hughes, *Fleet Tactics and Coastal Combat* (Annapolis: Naval Institute Press, 2002), 40-44. Referenced in John Q. Dickmann’s, *Speed: The Implications of Hull Speed for Tactical, Operational and Strategic Naval Operations*.

²⁷ General Gregory S. (Speedy) Martin, “Vision Takes Form,” *Aviation Week & Space Technology* (15 Aug 2005): 22. Former Air Force Chief of Staff John Jumper pushed the concept of “Cursor-Over-the-Target (CoT)” throughout his tenure as CSAF. In August 2005, General Gregory S. (Speedy) Martin, Chief of Air Force Material Command, presented an article to *Aviation Week & Space Technology* where he discusses Gen. Jumper’s “constructs” for this effort in detail. “Cursor-over-the-target” equates to the ability to select an object or person at will, study it, and quickly understand it. By melding this capability with other “science and technology” efforts, the Air Force seeks to control the battle space at will. CoT hopes to solve the problem of interoperability in the joint fight and replace the “human voice” in the Command and Control process where applicable.

²⁸ *Air Force Doctrine Document 1-1, Air Force Basic Doctrine*, 18 February 2004. This has over 16 references to speed throughout the document. Part of the Air Force culture and belief-sets include the idea that speed, range, and flexibility of air and space forces, combined with precision munitions and persistent C4ISR, allows air forces to mass power much faster than surface forces.

²⁹ Joint Chiefs of Staff, *The National Military Strategy of the United States, 2004* (Washington, DC: U.S. Joint Chiefs of Staff, 2004), available from <http://www.defenselink.mil/news/Mar2005/d20050318nms.pdf>; Internet; accessed 5 March 2006.

³⁰ Department of Defense, *The Quadrennial Defense Review Report* (Washington, D.C.: Department of Defense, February 2006), available from <http://www.defenselink.mil/qdr/report/Report20060203.pdf> Internet; accessed 15 February 2006. Note how this contrasts with the use of the words “long war” in the same document. It is interesting to note the paradox concerning the need to “swiftly defeat” within the context of the “long war.” This implies that the United States’ focus on speed produces mixed messages that confuse the public on issues concerning national policy and the attainment of national strategic objectives.

³¹ Quote taken from the movie *Top Gun* as dialogue spoken by Actors Tom Cruise and Anthony Edwards.

³² There are too many pharmaceutical companies to cite here. However, for the purposes of substantiating this point, a link to the Tylenol homepage is made available from <http://www.tylenol.com/index.jhtml>. Several brands of pain relievers seek to ease pain within 4-8 hrs. This is but one of the many company’s that advertise to the American public. Additionally, according to A.C. Nielson Company and the Public Broadcasting System, the average American person has seen approximately 2 million 30-second TV commercials by age 65 (reference link available from <http://www.csun.edu/~vceed002/health/docs/tv&health.html>),

and the average child sees approximately 20,000 commercials per year. Clearly, multiple forces repeatedly program Americans for speed, even at an early age.

³³ Bill Gates, *Business@ The Speed Of Thought: Succeeding In The Digital Economy* (Warner Business Books; First Edition, 2000). In 2006, Intel® introduced a new processor to match the mobility of the Internet called the Core™ Duo Processor with a clock speed of 2.16 Giga Hertz (billions of pulses per second). This is one of the fastest speeds on the market for mobile computing devices.

³⁴ Admiral Arthur K. Cebrowski and Dr. Thomas P.M. Barnett, "The American Way of War," *The U.S. Naval Institute* (January 2003): 42-43.

³⁵ Brian Greene, *The Elegant Universe: Superstrings, Hidden Dimensions, and the Quest for the Ultimate Theory*, First Vintage Books Edition, 1999, 2003, 33.

³⁶ Robert R. Leonhard, *Fighting by Minutes: Time and the Art of War* (Westport, CT: Praeger Publishers, 1994), 3-12.

³⁷ Hans Reichenbach, *The Direction of Time* (Berkeley: University of California Press, 1959). This is a seminal analysis of the nature of time, and attempts to dissuade the emotional perceptions of time by providing a physics-based scientific method for understanding and codifying the phenomena.

³⁸ N. David Mermin, *It's About Time: Understanding Einstein's Relativity* (Princeton University Press, 2005). Albert Einstein postulated the Theory of Special Relativity where he talks about the issue of *time dilation*. The effect of time dilation can be calculated with this formula:

$$\frac{\Delta t}{\Delta t_0} = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

where t_0 is the time interval in one reference frame and t is the time interval measured by an observer in another reference frame. " v " is the relative velocity of the same reference frame, and c is the speed of light. The denominator is always less than 1 ($v < c$), so $t > t_0$. This is important to point out in any discussion regarding time and relativity, and is provided to emphasize the point that time is not always a constant. The source of this information comes from chapters 1, 6 7, 8, 10, 11, and 12.

³⁹ Arms, "Strategic Culture: The American Mind." The author discusses how the pioneer need for survival translated into shortsighted outlook for day-to-day living. This trait was passed on through the generations and now pervades American thinking about time.

⁴⁰ Gary W. Gallagher, "Strengths and Weaknesses of the Union and Confederacy," *The American Civil War: The War in the Eastern Theater 1861-63* (Oxford: Osprey Publishing, 2001): 22-26. and Gary W Gallagher, Stephen D Engle, Robert K Krick, Joseph T Glatthaar, "Warring Sides: Strengths and Weaknesses of the Union and Confederacy," *The American Civil War: This Mighty Scourge of War* (Oxford: Osprey Publishing, 2001): 32-35.

⁴¹ Ibid., Gallagher, et al, "Warring Sides: Strengths and Weaknesses of the Union and Confederacy"

⁴² Ibid.

⁴³ Ibid.

⁴⁴ Ibid.

⁴⁵ Gallagher, "Strengths and Weaknesses of the Union and Confederacy" 22-26

⁴⁶ Theo Farrell, "Strategic Culture and American Empire," *SAIS Review* (Summer 2005): 4. Farrell also references in his Footnotes that the same is argued by Carl H. Builder, "The Masks of War: American Military Styles in Strategy and Analysis" (Baltimore: Johns Hopkins University Press, 1989).

⁴⁷ Arms, 10.

⁴⁸ Ibid., 11.

⁴⁹ CNN Money.com, available at http://money.cnn.com/2006/01/23/Autos/american_cars/, cited research from both J.D. Power and Associates and Consumer Reports 2005 highlighting that American-made cars tend to suffer significant problems at about the 3-year mark. Rather than divesting money to correct these problems, Americans tend to purchase newer vehicles with more improved capabilities.

⁵⁰ Jerome Bourdon, "Some Sense of Time: Remembering Television," *History and Memory*, 15 (Fall 2003): 1.

⁵¹ 24 is a popular program sponsored by Fox TV, available at <http://www.fox.com/24/>. Its main premise each season revolves around solving a national security problem through interagency cooperation within a span of 24 hours. Each season takes the suspense up to new levels to include nuclear terrorism, bio-terrorism, and assassinations. This program is the epitome of the American culture and the influence of speed and time on that culture.

⁵² Stephen Hawking, (*The Illustrated*) *A Brief History of Time* (Bantam Books: 1996), 196-206, and Brian Greene, *The Elegant Universe: Superstrings, Hidden Dimensions, and the Quest for the Ultimate Theory*, (Vintage: Vintage Edition, March 2000), 263-268. Quantum physics and special relativity theorizes the possibility of "wormholes" which are bridges or tunnels providing a shortcut through one region of the universe to another. Figure 1 is an example adapted from quantum theory that represents the universe as a 2-dimensional "U-shape." Using this as a framework, in such a universe the only way to travel the distance between two points at opposite ends of the universe is to travel the *entire distance of that universe*. However, if one were able to punch a hole through the fabric of space, they could theoretically build a bridge joining the two points together that disregards normal distances. Although a theoretical construct, this has applicability with respect to information technology in that advances in communications systems build similar bridges in the real world. Thus, they provide shortcuts that disregard space and time, and add to the aura of speed in American culture.

⁵³ Ibid., Greene, 34-84. Greene presents a fascinating perspective on the effects of speed and time worth reading in detail. His simple examples express complex ideas and references a notional perspective on the effects of speed and time on political decision-making.

⁵⁴ Arms, 19-20.

⁵⁵ Paul Virilio is a French cultural theorist. He is best known for his writings about technology as it has developed in relation to speed and power, with diverse references to architecture, the arts, the city and the military. The notion of Virilio's "Dromology" was highly detailed in his book *Speed & Politics*, originally published in 1977 as *Vitesse et Politique*, Éditions Galilée, Paris. He also discusses this in two other books: *Pure War*, written by Paul Virilio and Sylvère Lotringer, Semiotext(e) Columbia University Press 1997, and *Desert Screen: War at the Speed of Light*, first published in France 1991 under the title *L'Ecran du désert*, Éditions Galilée, Paris 1991. This paper references all three throughout this section of text.

⁵⁶ Edward T. Hall, *The Dance of Life: The Other Dimensions of Time* (New York: Anchor Press/Doubleday, 1983), 43, 50; quoted in Kevin Cunningham and Robert R. Tomes, "Space-Time Orientations and Contemporary Political-Military Thought," *Armed Forces and Society* 31 (Fall 2004): 124-126.

⁵⁷ Kevin Cunningham and Robert R. Tomes, "Space-Time Orientations and Contemporary Political-Military Thought," *Armed Forces and Society* 31 (Fall 2004): 125.

⁵⁸ Rhea Wessel, "Is there time to slow down?: As the world speeds up, how cultures define the elastic nature of time may affect our environmental health," *Christian Science Monitor* (January 2003): 9, 13. Quote by Edward T. Hall.

⁵⁹ Ibid., 13.

⁶⁰ Ibid.

⁶¹ Harlan Ullman and James Wade, Jr., *Shock and Awe: Achieving Rapid Dominance*, (National Defense University: Institute for National Strategic Studies, 1996), 10-15, 45.

⁶² Stephen Hawking, *(The Illustrated) A Brief History of Time* (Bantam Books, 1996), 198-210. Figure 2 was derived from this text.

⁶³ Rob Bartram, "Visuality, Dromology and Time Compression: Paul Virilio's New Ocularcentrism," *Time and Society* 13 (2004). This quote also comes from Virilio's book *Speed & Politics*.

⁶⁴ Ibid., 289.

⁶⁵ Ibid., 290.

⁶⁶ Hawking, 201-203. Figure 3 is also derived from quantum theory and applied to the circumstances of this paper. The concept was derived from Stephen Hawking, *(The Illustrated) A Brief History of Time*.

⁶⁷ Cunningham and Tomes, 126.

⁶⁸ Ibid., 126.

⁶⁹ Ibid., 136.

⁷⁰ Gray, 27-28.

⁷¹ Ibid., 29.

⁷² Ibid., 29-30.

⁷³ United States Department of Defense, "The Operation Desert Shield / Operation Desert Storm Timeline," *DefenseLink*, available from http://www.defenselink.mil/news/Aug2000/08082000_20008088.html; Internet; accessed 26 February 2006.

⁷⁴ Gray, 31-34.

⁷⁵ Farrell, 5-6. In this work, Farrell states that the steady stream of Vietnam War dead eroded U.S. support of the war. He also points out that the same occurred in Somalia when only 18 soldiers died and the furor that raised in public debate about that effort. Lastly, he identifies that this aversion was one of the key drivers that raised "political refusal" for ground force deployments in the Rwandan and Balkans conflicts.

⁷⁶ Ibid., Reichenbach and Hawking. No one has clearly defined time in a manner generally accepted in the scientific community. This definition gives a broad framework for understanding time in the context of social, political and military considerations. The inclusion of the Uncertainty Principle is important as time defies explanation. Created by German scientist Werner Heisenberg, the Uncertainty Principle states that it is impossible to determine exactly both the position and the velocity of a particle at the same moment. This concept is often used to discuss temporal events and speed in the scientific community.

⁷⁷ Hughes, 9. Hughes employed a definition of tactical, operational and strategic speed relevant for use in this paper.

⁷⁸ Ibid., 9-10.

⁷⁹ The military definition for strategic speed was synthesized from multiple joint doctrine publications. Varying sources view this type of speed in as many varying ways, but this definition seems most relevant for discussions in the military context.

⁸⁰ William H. McRaven, "*Spec Ops: Case Studies in Special Operations Warfare Theory and Practice*," *Presidio Press* (1995):19.

⁸¹ Hoffman, 45.

⁸² Professor John A. Bonin, "Modularity: Designing a Campaign Quality Army with Joint and Expeditionary Capabilities" presented to the Advanced Strategic Arts Program (ASAP) (22 Feb 2006). The formal guidance for the concept can be found in the Army Campaign Plan (unavailable for release at the time of this writing).

⁸³ Ibid. This information was sourced from a PowerPoint presentation entitled "Army Force Structure" presented to ASAP. Of the 790,000 personnel in the Army Operating Force, over ½ are in the ARNG or USAR with a disproportionate share of the CS/CSS in the Reserve Components.

⁸⁴ Williamson Murray and Robert H. Scales, Jr., *The Iraq War* (Cambridge, Mass: The Belknap Press of Harvard University Press, 2003), 94-128. These pages talk about the focus on speed and detail the move towards Baghdad. 245.

⁸⁵ John A. Bonin and Mark Gerner, "Continuous Concentric Pressure," *AUSA Land Warfare Paper* 43 (October 2003).

⁸⁶ Earl F. Ziemke, *The U.S. Army in the Occupation of Germany 1944-1946*, Army Historical Series (Washington D.C.: Center of Military History, United States Army, 1975), 24-33.

⁸⁷ Michael Gordon and Bernard Trainor, *The General's War: The Inside Story of Conflict in the Gulf* (Back Bay Books, 1995), 8, 141, and 172.

⁸⁸ "The National Security Strategy of the United States of America," Sept 2002, 15.

⁸⁹ Admiral Thomas P.M. Barnett, "Deleted Scenes: Rule-Set Shifts from the Cold War to Current Era," available from <http://www.thomaspmbarnett.com/delscenes/scene01.htm> : Internet; accessed 15 November 2006.

⁹⁰ Dr. Steven Metz, "American Strategy: Issues and Alternatives for the Quadrennial Defense Review," Strategic Studies Institute, Army War College, PA (September 2001): 37.

⁹¹ Cunningham and Tomes, 130.

⁹² Metz, 37.

⁹³ Nathan Light, "Pizza in 30 Minutes, or How to Order a War: A Study of the Political Institution of Time," *The Journal of American Culture* 17 (Spring 1994): 2-3. Light makes a powerful argument that U.S. leadership's astute management of time and speed in political dialogue avoided debate over the complexities and possible effects of the war. For example, the focus on timelines, schedules, the need to find weapons of mass prior to movement, et al forced the decision for preemptive American military action. Members of Congress and the Senate fit their discussions to time with key media times focused on their constituents, and the media responded accordingly. People who opposed this move argued that President Bush's decision disregarded Middle Eastern history and political complexity, and military action would further complicate regional issues there. Despite this, the country went to war. This example also reinforces Cunningham and Tomes' points regarding monochronic and polychronic societies. The U.S. monochronic perspective clashes with the polychronic nature of the Middle East.

⁹⁴ Record, 7-8.

⁹⁵ Anthony H. Cordesman, *The Iraq War: Strategy, Tactics, and Military Lessons* (Washington D.C.: The Center for Strategic and International Studies, 2003). Chapters 15-16 discuss many of nation-building lessons learned from that war.

⁹⁶ Record, 7-8.

⁹⁷ Hoffman, 44.

⁹⁸ Cunningham and Tones, 121.

⁹⁹ Ibid., 122 and 126. Spatial-Temporal Angst is an effect related to fear, stress and anxiety brought about by misunderstanding the effects global decision making have in relation to multiple cultures.

¹⁰⁰ Basil Liddell-Hart, *The Strategy of Indirect Approach* (Praeger, 1968), quoted in Pierre Lessard, "Campaign Design for Winning the War...and the Peace", *Parameters*, (Summer 2005): 36-50.

¹⁰¹ Metz, 52.

¹⁰² David Tucker, "The RMA and the Interagency: Knowledge and Speed vs. Ignorance and Sloth?," *Parameters* 30 (Autumn 2000): 2.

¹⁰³ Ibid., 3.

¹⁰⁴ Ibid., 5.

¹⁰⁵ Ibid.

¹⁰⁶ Antulio J. Echevarria II, "Rapid Decisive Operations: An Assumption-Based Critique," (Strategic Studies Institute, U.S. Army War College, Nov 2001): 13.

¹⁰⁷ Paul Virilio, *Speed & Politics*, (Semiotext(e), 1986), Chapter 2.

¹⁰⁸ Tucker, 3.

¹⁰⁹ Major Demetrios J. Nicholson, "Seeing the Other Side of the Hill: The Art of Battle Command, Decision Making, Uncertainty, and the Information Superiority Complex," *Military Review* (Nov-Dec 2005): 61.

¹¹⁰ Adams, 4.

¹¹¹ Nicholson, 62.

¹¹² Ibid., 64.

¹¹³ The Brookings Institute discusses the "CNN Effect" in detail during forum co-sponsored by Harvard University on January 29, 2002. This references the effect that continuous and instantaneous television has on foreign policy, the development of foreign policy, and the American conduct of war. Available from <http://www.brookings.edu/comm/transcripts/0020123.htm>: Internet; accessed 1 March 2006.

¹¹⁴ Gilles Van Nederveen, "Technology for the Future Leaders: International Command and Control Enhancements," *Aerospace Power Journal* 15 (Summer 2001): 79.

¹¹⁵ Adams, 2.

¹¹⁶ Hoffman, 45.

¹¹⁷ Arden B. Dahl, "Command Dysfunction: Minding the Cognitive War," School for Advanced Airpower Studies, Maxwell AFB, AL (June 1996), available from <http://www.fas.org/man/eprint/dahl.htm>; Internet; accessed 25 February 2006.

¹¹⁸ Tucker, 6.

¹¹⁹ Ibid., 7. Tucker goes on to point out that, "Such rapid strategic maneuver may result in strategic preclusion, denying the enemy the operational opportunity or objectives he seeks. If we can demonstrate such a capability, we may even deter conflict."

¹²⁰ Ibid.

¹²¹ Ibid.

¹²² Ibid., 9. Tucker notes that military will have its hand full with firefights, humanitarian assistance efforts, and Non-Combatant Evacuations while simultaneously facilitating the transition to a legitimate civilian authority. The Interagency play in these efforts is certain.

¹²³ Tucker makes a similar proposal in his paper and goes further to clarify his point. He notes that the Interagency view of time focuses on shaping and preparation long-term efforts. This conflicts with the traditional military traits of rapid decisiveness and speed. Therefore, planners must find a way to blend these two together to achieve desired effects. This could include the initiation of Interagency training, planning and readiness activities and establishing common doctrine, processes and infrastructures before conflict begins. The time it takes to do this may sometimes negate strategic speed unless planners think about the influences of speed and time prior to the eruption of crises.

¹²⁴ Hoffman, 46.

¹²⁵ P.H.. Liotta, "Chaos as Strategy," *Parameters* 32 (Summer 2002): 2.

¹²⁶ Murray and Scales, Jr., 94-128. These pages talk about the focus on speed and detail the move towards Baghdad.

¹²⁷ Ibid., 245-246.

¹²⁸ Ullman, 88.

¹²⁹ Liotta, 4.

¹³⁰ Cunningham and Tones, 135. The authors make the profound statement that "The opponent may be hunted, but it will not feel any threat to the external validity of its idea." The enemy has to *recognize, understand, and agree* that they are defeated before it is so.

¹³¹ Colonel Ricky E. Hardie (USA), "Planning in Time," Naval War College, Newport, RI, 1992, 5.

¹³² Cunningham and Tomes, 133.

¹³³ Derived from the "Capstone Concept for Joint Operations, Version 2.0", Joint Staff, J-7, Department of Defense, Aug 2005, Appendix D: Integration of Joint Activity, 2, available from http://www.dtic.mil/futurejointwarfare/concepts/approved_ccjov2.pdf; Internet; accessed 7 March 2006.

¹³⁴ Georges S. Day and David J. Reibstein, "Chapter 8: Anticipating Reactions: Factors that Shape Competitor Responses," *Wharton on Dynamic Competitive Strategy*, (Wharton School: John Wiley & Sons, Inc, 1997): 210, 212, 213, 214. Figure 7 was adapted from this text.

¹³⁵ Larry K. Wentz and Lee W. Wagenhals, "Effects Based Operations for Transnational Terrorist Organizations: Assessing Alternative Courses of Action to Mitigate Terrorist Threats," George Mason University C3I Center: 22-26, available from http://www.dodccrp.org/events/2004/CRTS_San_Diego/CD/papers/178.pdf; Internet; accessed 8 March 2006.

¹³⁶ Echevarria, RDO, 17.

¹³⁷ Michael R. Gordon and Bernard E. Trainor, "Dash to Baghdad Left Top U.S. Generals Divided," *New York Times*, 13 March 2006 [newspaper on-line]; available from <http://www.nytimes.com/2006/03/13/international/middleeast/13command.html?hp&ex=1142226000&en=6d9e5888362acd9b&ei=5094&partner=homepage>; Internet; accessed 13 March 2006. This article goes to the heart of the "speed in war" debate. If a senior leader can be fired from his / her position based on a desire to employ variable speed in war, others may not choose that option; this would reinforce the pathologies discussed.

¹³⁸ Ibid.

¹³⁹ This information sourced Michael Fowler's lecture, "The Life of Galileo," University of Virginia Physics Department, available from http://galileoandeinstein.physics.virginia.edu/lectures/gal_life.htm; Internet; accessed 9 March 2006. Copernicus was one of the first astronomers to posit the idea that the solar system was heliocentric (Sun-centered) and not geocentric (Earth-centered). His beliefs were in direct conflict with the religious and philosophical dogma of the period that saw Man as superior and his world as the center of the universe. Later, astronomer Galileo Galilei continued where Copernicus left off, and he began to disclose his viewpoints of a heliocentric cosmos in public. When the Catholic Church learns of this, he was eventually tried and convicted of heresy by the Inquisition, and later imprisoned under house arrest as a heretic.

¹⁴⁰ Cunningham and Tomes, 128-129. The authors state that the U.S. embraces a national security strategy and military doctrine prone to spatial-temporal chauvinism. This means that American strategic leaders push time-based strategies without understanding the effect these strategies will have on the economics and socio-cultural aspects of that situation.

¹⁴¹ Cordesman, 173-211.

¹⁴² Liotta, 4.

